Remarks

The Applicants note with appreciation the withdrawal of the previous objection to the drawings.

Claims 19-36 were previously pending. Claims 19 and 36 have been amended to clarify the claim features, support for which may be found at least in paragraph [0037] of the originally-filed Specification. New Claim 37 is herein added, support for which may be found in FIG. 3 and the corresponding description in paragraphs [0041]-[0044] of the originally-filed Specification. Thus, Claims 19-37 are currently pending.

35 USC §103(a) Rejections

Claims 19-21, 24-32, 35, and 36 stand rejected under 35 USC §103(a) as being unpatentable over Lum in view of Cory. Claims 22, 23, 33, and 34 stand rejected under 35 USC §103(a) as being unpatentable over Lum, in view of Cory, and further in view of Beyerlein. The Applicants respectfully request reconsideration and withdrawal of the 35 USC §103(a) rejections based on the reasons set forth below.

Independent Claim 19 recites an exploration device for monitoring penetration of an instrument in an anatomic structure. The device of Claim 19 includes two or more electrodes with a source of voltage supplying the electrodes. The device also includes means for measuring an impedance of the anatomic structure between the electrodes. Means of angular location is formed by at least one electrode punctually coinciding with a peripheral surface of the penetration instrument. The coinciding surface of the electrode is set off from a longitudinal axis of the instrument. The device also includes means for detecting an angular position of the at least one electrode that punctually coincides with the peripheral surface of the instrument.

Thus, the device according to Claim 19 provides a determination of the position and the

direction of a gap during the drilling of an anatomic structure by detecting variation of impedance within tissue between two electrodes. The determination is obtained by using a detection offset in a direction transverse of the longitudinal axis of the instrument to determine an angular position of the gap via the means of angular location recited in Claim 19.

Claim 36, similar to Claim 19, recites an exploration device including at least two electrodes supplied by a voltage source, an impedance measuring device that measures impedance between the electrodes, an angular locator, and a detector for detecting an angular position of at least one electrode that punctually coincides with a peripheral surface of the penetration instrument.

The Applicants respectfully submit that neither Lum nor Cory disclose at least the means of angular location as recited in Claim 19 or the angular locator as recited in Claim 36.

Lum describes a penetration device that determines when a predetermined depth has been reached and that accordingly stops the penetration. The device therefore reduces the depth of penetration by stopping penetration at a depth deemed adequate to achieve the desired results. (*See* column 1, lines 14-30, and column 4, lines 49-57 of Lum.) The device disclosed by Lum penetrates "into an object which has impedance that varies according to the depth under a surface of the object." A change of impedance of the object is sensed by two conductive ends near the penetration tip, thus providing information relating to the desired depth of penetration. (*See* column 1, line 62 – column 2, line 4 of Lum.)

Thus, Lum's device employs axial detection along a longitudinal axis of the penetration instrument to determine the penetration depth. The axial detection is illustrated with reference to FIG. 2a of Lum, in which the conductive end 125 (i.e., the electrode) is formed by a conductive coating 122 on the outer surface of the nonconductive tubing 116. (*See* column 3, lines 33-49 of

Lum.)

Therefore, the Applicants respectfully submit that in Lum, the electrode is tubular and does not punctually coincide with a peripheral surface of the penetration instrument, where the coinciding surface has a position set off from a longitudinal axis of the penetration instrument, as recited in Claims 19 and 36. The Applicants respectfully refer the Examiner to paragraph [0011] of the originally-filed Specification where "punctually coinciding" is defined as "a contact surface partially and discontinually coinciding with the peripheral surface of the aforementioned penetration instrument. In particular, an angular contact surface, and by extension a tubular shape are not considered as providing punctual coincidence."

Additionally, Lum's device does not determine an angular position of the electrode, as recited in Claims 19 and 36. Instead, Lum's device simply determines when a predetermined depth has been reached. This determination is achieved by measuring a value of impedance which is correlated to a depth penetration that is based on experimental data. Lum describes that "the change in impedance with the depth of penetration is determined experimentally" by penetration depth and sample volume of a human, or by obtaining impedance data versus depth specifically for a patient. (*See* column 7 lines 6-16 of Lum.)

Cory discloses a device that determines a resistance between the needle and a return electrode 135. (*See* FIG. 4 and column 7, line 57 – column 8, line 4 of Cory.) Thus, Cory does not take into account the anatomic structure's impedance, as do the devices of Claims 19 and 36. Cory also does not disclose the means of angular location recited in Claim 19 or the angular locator recited in Claim 36.

Thus, the combination of Lum and Cory does not include each aspect of both Claim 19 and Claim 36. Accordingly, the Applicant respectfully submits that the above considerations set

forth with respect to Lum and Cory are such that the any theoretical combination of Lum and Cory fails to result in the devices of independent Claims 19 and 36. Thus, withdrawal of the §103(a) rejection of Claim 19, as well as its dependent Claims 20, 21, 24-32, and 35, and independent claim 36, is respectfully requested.

Dependent Claims 22, 23, 33, and 34 are patentable at least for being dependent upon Claim 19, shown above to be patentable. Moreover, Beyerlein does not remedy the deficiencies noted above with respect to Lum and Cory. Accordingly, withdrawal of the §103(a) rejection of Claims 22, 23, 33, and 34 is respectfully requested.

New Claim 37 is dependent on Claim 36 and recites that "the at least one electrode is surrounded by an insulator and comprises an end that is locally flush with the peripheral surface of the instrument while being offset with respect to the longitudinal axis of the instrument." The Applicants respectfully submit that Claim 37 is patentable at least for being dependent upon Claim 36, shown above to be patentable.

In light of the foregoing, the Applicants respectfully submit that the entire application is now in condition for allowance, which is respectfully requested.

Respectfully submitted,

T. Daniel Christenbury
Reg. No. 31,750
Attorney for Applicants

TDC/vp
(215) 656-3381